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Report on a Rare Pedipalpal Change in the Pseudoscorpion, *Roncus yaginumai* ĆURČIĆ, ĆURČIĆ et DIMITRIJEVIĆ (Pseudoscorpiones: Neobisiidae)

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Abstract The paratype female of *Roncus yaginumai* ĆURČIĆ, ĆURČIĆ et DIMITRIJEVIĆ, from Montenegro, Yugoslavia, exhibits a rare change in the pedipalpal structure, affecting the form, size, and trichobothrial pattern of the movable chelal finger on the right. This structural deviation has been described and illustrated. Probable causes of its origin and genesis are briefly discussed.

Structural anomalies of the pedipalpal chelae have been reported in *Cryptocreagris laudabilis* (HOFF), *Neobisium bernardi* VACHON, *N. carcinoides* (HERMANN), *N. carpaticum* BEIER, *N. cephalonicum* (DADAY), *N. fuscimanum* (C. L. KOCH), *N. simoni* (L. KOCH), *N. sylvaticum* (C. L. KOCH), *Roncus jarilo* ĆURČIĆ, *R. pannonius* ĆURČIĆ, DIMITRIJEVIĆ et KARAMATA, *R. pripegala* ĆURČIĆ, *Garypus levantinus* NAVAS, *Diplotemnus insolitus* CHAMBERLIN, *Chelifer cancroides* (LINNAEUS), *Ellingsenius fulleri* (HEWITT et GODFREY), *Xenochelifer davidi* CHAMBERLIN, *Americhernes incertus* MAHNERT, *Ectromachernes mirabilis* BEIER, and *Chernes hahnii* (C. L. KOCH) (MAHNERT, 1979, 1988; ĆURČIĆ *et al.*, 1995, 1996). All these changes were classified as: multiple size reduction of pedipalpal podomeres; size reduction of either fixed or movable chelal finger; changes in the trichobothrial and setal patterns; changes in chelal dentition, and fusion of some pedipalpal and pedal articles. In two instances only (*N. carpaticum* and *N. simoni*), the fixed chelal fingers were reduced; the frequency of such anomalies was 0.005% and 0.06%, respectively. However, examples of the reduction of the movable chelal finger were more numerous (*N. carcinoides, N. bernardi, X. davidi*), with a frequency of 0.05%-0.47% (ĆURČIĆ *et al.*, 1995). Furthermore, the reduction in number of some trichobothria on the pedipalpal chelae was noted in *N. bernardi, N. carcinoides, N. cephalonicum, N. simoni, R. jarilo, R. pannonius*, and *A. incertus* (MAHNERT, 1979; ĆURČIĆ *et al.*, 1995), while supernumerary trichobothria were registered in *R. pannonius, R. pripegala* and *E. mirabilis* (MAHNERT, 1988; ĆURČIĆ, 1988; ĆURČIĆ *at al.*, 1996). Furthermore, an outstanding variation of the trichobothrial pattern (including the phenomena of either additional or missing trichobothria) in *R. pannonius* was reported elsewhere (ĆURČIĆ *et al.*, 1996).

During the study of the type series of *Roncus yaginumai* ĆURČIĆ, ĆURČIĆ, et DIMITRIJEVIĆ (Neobisiidae, Pseudoscorpiones), we discovered a specimen (paratype female) with a remarkably changed structure of the right pedipalpal chela. This kind of deviation, involving both enlargement and elongation of the movable chelal finger as well as the occurrence of 5 supernumerary trichobothria on this finger, is reported for the

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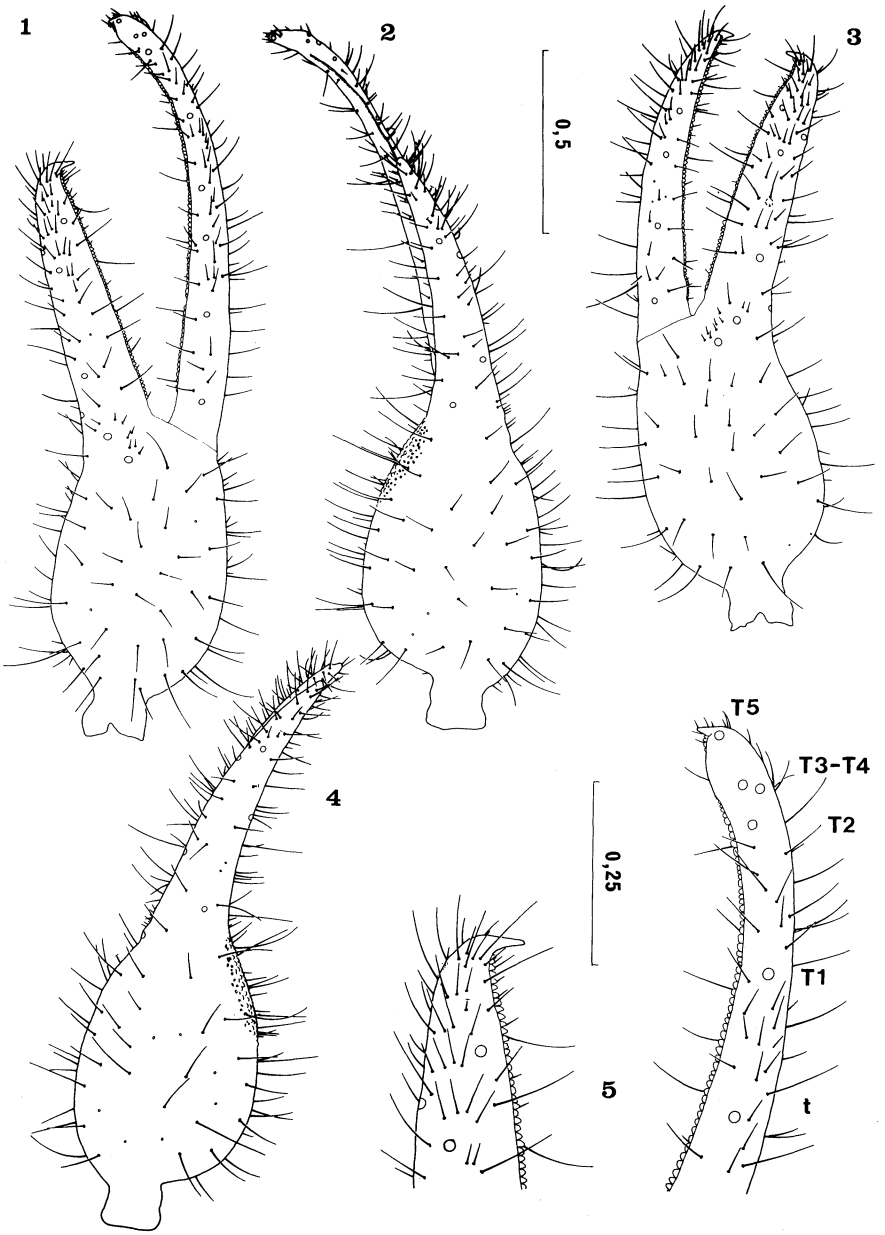

Figs. 1–5. *Roncus yaginumai* ĆURČIĆ, ĆURČIĆ et DIMITRIJEVIĆ, paratype female, from a cave on the isle of Vranjina, near Podgorica, Montenegro (Yugoslavia). —— 1, Right (abnormal) chela, lateral view; 2, right (abnormal) chela, dorsal view; 3, left (normal) chela, lateral view; 4, left (normal) chela, dorsal view; 5, tips of the fixed and movable fingers of the right (abnormal) chela. Abbreviations: *t*=seta terminalis, T1–5=supernumerary (or additional) trichobothria, distal to *t*. Scales in mm.

first time in the present study. The aberrant specimen of *R. yaginumai* was collected by I. M. KARAMAN in January 1992 in a cave on the isle of Vranjina, near Podgorica, Montenegro (Yugoslavia). The shape, measurements and morphometric ratios of different body structures (except for the abnormal right chela) correspond to normal values for the species (ĆURČIĆ *et al.*, 1996). However, the right movable chelal finger is elongated and apically enlarged (Figs. 1, 2, & 5), while its (left) complement is normal in all respects (Figs. 3, 4). However, the abnormal movable finger is much longer than either the (right) fixed chelal finger (1.36 mm *vs.* 0.85 mm) or the movable chelal finger on the left (1.36 mm vs. 0.89 mm) (Figs. 1, 3). Additionally, it carries more teeth in relation to its normal complement (89 *vs.* 64). Apically, some teeth are missing due to the occurrence of a small distal protuberance on this finger (Fig. 5). Interestingly, the (abnormal) movable chelal finger carries 4 normal (*t, st, sb*, and *b*) and 5 additional trichobothria (T1–T5) which are distal to *t* (Fig. 5); of these 5 sensitive setae, one (T5) is apical, three (T2–T4) are subapical, while one (T1) is proximal to T2–T4. All supernumerary trichobothria are found distal to *t*.

The question of the origin and development of the anomalous pedipalpal chela on the right is mostly intriguing. It is doubtless that the growth of this elongated and apically enlarged podomere had started prior to the protonymph stage, probably due to the action of some developmental and genetic factors (ĆURČIĆ et al., 1996). Since the specimen studied is adult, it is evident that it had passed all postembryonic moults successfully, although the noted chelal deviation could have affected the normal moulting process. The occurrence of as many as 9 trichobothria (instead of 4) on the abnormal chelal finger suggests that even a highly organized system (or the trichobothrial pattern) with a high degree of "canalization" (*sensu* WADDINGTON, 1957) still possesses some flexibility during the development. In general, individual deviations in the form, which create variants within populations, might result from a number of "things gone wrong" in the developmental process. A gene mutation, a mechanical trauma suffered by an embryo, unexpected temperature or humidity changes are all potentially capable of twisting the developmental path toward an abnormal phenotype. Under given circumstances, this might be a selective disadvantage. However, a significant change in a complex system, as exemplified by the trichobothrial pattern, depends upon major relational shifts of an almost improbable sort that will occur only as a rare event. It should also be noted that in evolving a new system, it is often necessary to overcome the canalizing effect, which maintains the balance of the old ("normal") system, leaving the individual without a range of adaptability and integration, otherwise possessed by its ancestors. For example, although MAYR (1963) claimed that both canalization and possession of highly organized (adaptive) systems restrict the possible directions of evolutionary changes, this restriction is not absolute. Complex systems, as observed in the trichobothrial pattern in *R. yaginumai*, can be revised and, if so, a new, fundamentally distinct type of organization might eventually arise.

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